CLAIMS

WHAT IS CLAIMED IS:

1. A fractionator for collecting at least a portion of a sample disposed in a sample tube, the fractionator comprising:

a head having a head surface at a forward end of the head, the head being configured to form a slideable seal with the inside surface of a sample tube;

a collection port disposed forward of the head surface; and

a fluid passageway in fluid communication with the collection port, the fluid passageway being configured and arranged to allow fluid transport from the sample tube to a sample receptacle.

2. The fractionator of claim 1, wherein:

the head surface of the head is positioned inside the sample tube; and

a plenum space is defined forward of the head and is bounded, at least in part, by the head surface, the collection port, and the inner surface of the sample tube.

3. The fractionator of claim 1, wherein:

the head is configured for use with a sample tube having a pre-determined sample tube cross-section;

the collection port has a predetermined collection port cross-section; and

the ratio of the collection port cross-section to the sample tube cross-section is in the range of from 1:10 to 1:1000.

4. The fractionator of claim 3, wherein the ratio of the collection port cross-section to the sample tube cross-section is in the range of from 1:25 to 1:100.

5. The fractionator of claim 1, wherein the collection port is placed off-center from the center of the head.

6. The fractionator of claim 1, wherein the collection port is placed at the center of the head.

7. The fractionator of claim 1, wherein the collection port is configured and arranged to isolate the head surface from a sample during collection of the sample from the sample tube.

8. A fractionating system for collecting at least a portion of a sample disposed in a sample tube, the fractionating system comprising:

a head having a head surface at a forward end of the head, the head being configured to form a slideable seal with the inside surface of a sample tube;

a collection port disposed forward of the head surface;

a valve in fluid communication with the collection port; and

a valve controller configured and arranged to operate the valve based, at least in part, on the location of the collection port with respect to a sample disposed in the sample tube.

9. The fractionating system of claim 8, wherein the valve is configured and arranged to selectively direct the flow of the sample from the sample tube into one or more sample receptacles.

10. The fractionating system of claim 8, further comprising:

a drive unit connected to the head, the drive unit being configured and arranged to move the head with respect to the sample tube.

11. The fractionating system of claim 8, further comprising:

a location detection device in operative communication with the valve, the location detection device being capable of producing a collection port location signal based, at least in part, on the position of the collection port with respect to the sample disposed in the sample tube;

wherein the operation of the valve is based, at least in part, on the collection port location signal.

12. The fractionating system of claim 11, further comprising:

a drive unit connected to the head, the drive unit being configured and arranged to move the head with respect to the sample tube;

wherein:

the location detection device is in operative communication with the drive unit; and

the operation of the drive unit is based, at least in part, on the collection port location signal.

13. The fractionating system of claim 12, wherein the location detection device comprises a video camera capable of producing the collection port location signal.

14. A method for collecting at least a portion of a sample disposed in a sample tube, the method comprising the steps of:

providing a head configured to form a slideable seal with the inside surface of a sample tube, a collection port disposed forward of the head, and a fluid passageway in fluid communication with the collection port, the fluid passageway being configured and arranged to allow fluid transport from the sample tube to one or more sample receptacles; and

advancing the head and the collection port into the sample tube until at least a portion of the sample is transported through the collection port and the fluid passageway and into at least one of the one or more sample receptacles.

15. The method of claim 14, further comprising the steps of:

providing a valve in fluid communication with the fluid passageway, the valve being configured and arranged to selectively direct the flow of the sample from the sample tube into at least one of the one or more sample receptacles; and

operating the valve to direct at least a portion of the sample into at least a selected one of the one or more sample receptacles.

16. The method of claim 15, further comprising the steps of:

providing a location detection device in operative communication with the valve, the location detection device being capable of producing a collection port location signal based, at least in part, on the position of the collection port with respect to the sample disposed in the sample tube; and

operating the valve based, at least in part, on the collection port location signal.